REMARKS

The Office Action dated October 1, 2006 has been received and carefully noted. The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

Claims 1, 9, 13-20, and 23 have been amended to more particularly point out and distinctly claim the subject matter of the invention. No new matter has been added. Therefore, claims 1-23 are currently pending in the application and are respectfully submitted for consideration.

The Office Action rejected claims 1-2 and 4-23 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,708,754 ("Wynn"). The rejection is respectfully traversed for at least the following reasons.

Claim 1, upon which claims 2-12 are dependent, recites a method which includes receiving a speech signal including voice signals and background signals. The method further includes detecting voice activity and providing an indicator when no voice activity is detected. The method further includes encoding the speech signal to generate a plurality of parameters representing the signal. The method further includes, when the indicator is not present, outputting a first parametric representation of the speech signal comprising the plurality of parameters, and, when the indicator is present, modifying at least one of the plurality of parameters and outputting a second parametric representation of the speech signal including the modified parameter.

Claim 13, upon which claims 14-17 are dependent, recites an apparatus which includes an input configured to receive a speech signal including voice signals and background signals. The apparatus further includes a voice activity detector configured to detect voice activity and to provide an indicator when no voice activity is detected. The apparatus further includes an encoder configured to encode the speech signal to generate a plurality of parameters representing the signal. The apparatus further includes modifying circuitry configured to modify, when the indicator is present, at least one parameter of the plurality of parameters. The apparatus further includes an output configured to output a first parametric representation of the speech signal when the indicator is not present, the first parametric representation comprising the plurality of parameters, and configured to output a second parametric representation of the speech signal when the indicator is present, the second parametric representation comprising the modified parameter.

Claim 18 recites an apparatus which includes receiving means for receiving a speech signal including voice signals and background signals. The apparatus further includes detecting means for detecting voice activity and providing an indicator when no voice activity is detected. The apparatus further includes encoding means for encoding the speech signal to generate a plurality of parameters representing the signal. The apparatus further includes outputting means for, when said indicator is not present, outputting a first parametric representation of the speech signal comprising said plurality of parameters, and, when the indicator is present, modifying at least one of the

parameters and outputting a second parametric representation of the speech signal including the modified parameter.

Claim 19 recites a communications system which includes input means for receiving a speech signal including voice signals and background signals. The communication system further includes voice activity detection means for detecting voice activity and to provide an indicator when no voice activity is detected. The communication system further includes encoder means for encoding the speech signal to generate a plurality of parameters representing the signal. The communication system further includes modifying means for modifying, when the indicator is present at least one of the parameters. The communication system further includes output means for outputting, when the indicator is not present, a first parametric representation comprising said plurality of parameters, and for outputting a second parametric representation of the speech signal when the indicator is present, the second parametric representation including the modified parameter.

Claim 20, upon which claim 21 is dependent, recites a network entity which includes an input configured to receive a speech signal including voice signals and background signals. The network entity further includes a voice activity detector configured to detect voice activity and to provide an indicator when no voice activity is detected. The network entity further includes an encoder configured to encode the speech signal to generate a plurality of parameters representing the signal. The network entity further includes modifying circuitry configured to modify, when the indicator is present,

at least one parameter of the plurality of parameters. The network entity further includes an output configured to output a first parametric representation of the speech signal when the indicator is not present, the first parametric representation comprising the plurality of parameters, and configured to output a second parametric representation of the speech signal when the indicator is present, the second parametric representation comprising the modified parameter.

Claim 22 recites a computer program comprising a code sequence which, when executed on a computer, encodes speech by implementing the method which includes receiving a speech signal including voice signals and background signals. The method further includes detecting voice activity and providing an indicator when no voice activity is detected. The method further includes encoding the speech signal to generate a plurality of parameters representing the signal. The method further includes when the indicator is not present, outputting a first parametric representation of the speech signal comprising the plurality of parameters, and, when the indicator is present, modifying at least one of the plurality of parameters and outputting a second parametric representation of the speech signal including the modified parameter.

Claim 23 recites a communications system which includes an input unit configured to receive a speech signal including voice signals and background signals. The communication system further includes a voice activity detection unit configured to detect voice activity and to provide an indicator when no voice activity is detected. The communication system further includes an encoder unit configured to encode the speech

signal to generate a plurality of parameters representing the signal. The communications system further includes a modifying unit configured to modify, when the indicator is present at least one of the parameters. The communication system further includes an output unit configured to output, when the indicator is not present, a first parametric representation comprising said plurality of parameters, and to output a second parametric representation of the speech signal when the indicator is present, the second parametric representation comprising the modified parameter.

Thus, according to embodiments of the present invention, the modification of the parameters of a digital speech signal has an effect of smoothing background noise in the parameterized digital speech signal. Furthermore, according to embodiments of the present invention, the effect of smoothing background noise increases the overall speech quality of the digital speech signal.

As will be discussed below, Wynn fails to disclose or suggest all of the elements of the claims, and therefore, fails to provide the advantages and features described below.

Wynn generally discloses a signal processing method for a communication network, which filters out noise using iterative estimation of the LPC speech model with the addition of real-time operation continuous estimation of the noise power spectrum, modification of the signal refiltered each iteration, and time constraints on the number of poles and their movements across time frames.

Applicants respectfully submit that Wynn fails to disclose, teach, or suggest, all of the elements of the present claims. For example, Wynn does not disclose, teach, or

suggest, at least, "when the indicator is not present, outputting a first parametric representation of the speech signal comprising the plurality of parameters, and, when the indicator is present, modifying at least one of the plurality of parameters and outputting a second parametric representation of the speech signal including the modified parameter," as recited in claims 1 and 22; "modifying circuitry configured to modify, when the indicator is present, at least one parameter of the plurality of parameters," and "an output configured to output a first parametric representation of the speech signal when the indicator is not present, the first parametric representation comprising the plurality of parameters, and configured to output a second parametric representation of the speech signal when the indicator is present, the second parametric representation comprising the modified parameter," as recited in claims 13 and 20; "outputting means for, when said indicator is not present, outputting a first parametric representation of the speech signal comprising said plurality of parameters, and, when the indicator is present, modifying at least one of the parameters and outputting a second parametric representation of the speech signal including the modified parameter," as recited in claim 18; "modifying means for modifying, when the indicator is present at least one of the parameters," and "output means for outputting, when the indicator is not present, a first parametric representation comprising said plurality of parameters, and for outputting a second parametric representation of the speech signal when the indicator is present, the second parametric representation including the modified parameter," as recited in claim 19; and "a modifying unit configured to modify, when the indicator is present at least one of the

parameters," and "an output unit configured to output, when the indicator is not present, a first parametric representation comprising said plurality of parameters, and to output a second parametric representation of the speech signal when the indicator is present, the second parametric representation comprising the modified parameter," as recited in claim 23.

Wynn disclose a process that comprises a model-based iterative signal estimator, a Voice Activity Detector (VAD), which continuously detects noise or speech-plus-noise frames and determines if a speech frame is voiced or unvoiced, and a noise suppression circuit combined with a suppressor. Wynn discloses that when a processed frame is detected as noise only, the process performed by the signal estimator is not implemented and the VAD signals the noise suppression circuit to switch in the suppressor. Wynn further discloses that, when a noise-only frame is detected, the VAD signals a noise weight update function associated with the signal estimator to make a new noise spectral estimate based on the current noise frames and to combine it with the previous noise spectral estimate (column 4, lines 7-27). However, Wynn fails to disclose that the suppressor modifies at least one of the parameters of the noise frame.

Furthermore, Wynn fails to disclose that the processor outputs a second parametric representation of the speech signal including a modified parameter. Instead, Wynn discloses that a noise weight update function makes a new noise spectral estimate based on the current noise frames and combines it with a previous noise spectral estimate. Wynn fails to disclose that the noise spectral estimate is ever outputted with the digital

speech signal. Instead, Wynn discloses that the noise spectral estimate is subsequently used for iterative filtering of a speech block (column 5, line 65 – column 6, line 9). Thus, Wynn fails to disclose, teach, or suggest, at least, "when the indicator is not present, outputting a first parametric representation of the speech signal comprising the plurality of parameters, and, when the indicator is present, modifying at least one of the plurality of parameters and outputting a second parametric representation of the speech signal including the modified parameter," as recited in claims 1 and 22, and similarly recited in claims 13, 18-20, and 23.

Therefore Wynn fails to disclose, teach, or suggest all of the elements of claims 1, 13, 18-20, and 22-23. For the reasons stated above, Applicants respectfully request that this rejection be withdrawn.

Claims 2 and 4-12 depend from claim 1, claims 14-17 depend from claim 13, and claim 21 depends from claim 20. Thus, Applicants respectfully submit that claims 2, 4-12, 14-17, and 20 should be allowed, at least, for their dependence upon claims 1, 13, and 20, and for the specific limitations recited therein.

The Office Action rejected claim 3 under 35 U.S.C. § 103(a) as being unpatentable over Wynn, and further in view of U.S. Patent No. 6,823,303 ("Su"). The Office Action took the position that Wynn discloses all of the elements of claim 3 except "wherein the plurality includes a gain parameter based on open-loop lag value." The Office Action then cited Su as allegedly curing this deficiency in Wynn. The rejection is respectfully traversed for at least the following reasons.

The description of Wynn discussed above is incorporated herein. Su generally discloses that a multi-rate speech codec supports a plurality of encoding bit rate modes by adaptively selecting encoding bit rate modes to match communication channel restrictions. In higher bit rate encoding modes, an accurate representation of speech through CELP (code excited linear prediction) and other associated modeling parameters are generated for higher quality decoding and reproduction. For each bit rate mode selected, pluralities of fixed or innovation subcodebooks are selected for use in generating innovation vectors. The speech coder distinguishes various voice signals as a function of their voice content. For example, a Voice Activity Detection (VAD) algorithm selects an appropriate coding scheme depending on whether the speech signal includes active or inactive speech. The encoder may consider varying characteristics of the speech signal including sharpness, a delay correlation, a zero-crossing rate, and a residual energy. Su further discloses that code excited linear prediction is used for voice active signals whereas random excitation is used for voice inactive signals; the energy level and spectral content of the voice inactive signal may also be used for noise coding.

Claim 3 depends from claim 1. As described above, Wynn does not disclose, teach, or suggest, all the elements of claim 1. Furthermore, Su does not cure the deficiencies in Wynn, as Su also does not disclose, teach, or suggest, at least, "when the indicator is not present, outputting a first parametric representation of the speech signal comprising the plurality of parameters, and, when the indicator is present, modifying at

least one of the plurality of parameters and outputting a second parametric representation of the speech signal including the modified parameter," as recited in claim 1.

Su discloses that the first stage of operations is performed by the speech encoder. Specifically, a source encoder processing circuitry performs high pass filtering of a speech signal. After such filtering, the source encoder processing circuitry applies a perceptual weighting filter which operates to emphasize the valley areas of the filtered speech signal. If the encoder processing circuitry selects operation in a pitch preprocessing (PP) mode, a pitch preprocessing operation is performed on the weighted speech signal. The pitch preprocessing operation involves warping the weighted speech signal to match interpolated pitch values that will be generated by the decoder processing circuitry. When pitch preprocessing is applied, the warped speech signal is designated a first target signal. If pitch preprocessing is not selected, the weighted speech signal passes through without pitch preprocessing and is designated the first target signal (column 6, lines 24-40).

Su fails to disclose using an indicator for determining which parametric representation of the speech signal is outputted. Instead, Su discloses the selection of various modes and processing the signal according to the selected mode. Therefore, Su, and thus the combination of Wynn and Su, fails to disclose, teach, or suggest, at least, "when the indicator is not present, outputting a first parametric representation of the speech signal comprising the plurality of parameters, and, when the indicator is present, modifying at least one of the plurality of parameters and outputting a second parametric

representation of the speech signal including the modified parameter," as recited in claim 1.

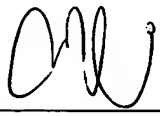
Therefore the combination of Wynn and Su fails to disclose, teach, or suggest all of the elements of claim 3. Additionally, claim 3 should be allowed for its dependence upon claim 1, and for the specific limitations recited therein. For the reasons stated above, Applicants respectfully request that this rejection be withdrawn.

For at least the reasons discussed above, Applicants respectfully submit that the cited prior art references fails to disclose or suggest all of the elements of the claimed invention. These distinctions are more than sufficient to render the claimed invention unanticipated and unobvious. It is therefore respectfully requested that all of claims 1-23 be allowed, and this application passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicants' undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



Majid S. AlBassam
Registration No. 54,749

Customer No. 32294
SQUIRE, SANDERS & DEMPSEY LLP
14TH Floor
8000 Towers Crescent Drive
Tysons Corner, Virginia 22182-2700
Telephone: 703-720-7800
Fax: 703-720-7802

KMM/ksh